EXPEDITED SITE CHARACTERIZATION (ESC) using the M3 Approach.

M^3 = Massive, Moderate, Minimum

The main objective of the this approach is to quickly and cost effectively identify and classify potential Areas of Concern (AOCs) as "clean" or contaminated, thus allowing potentially responsible parties (PRPs) to save limited resources by ceasing costly investigations and undertaking closeout or removal type actions expeditiously. The ESC M^3 approach also overcomes the high degree of uncertainty typically associated with traditional site investigations resulting from a lack of comprehensive scoping. Thus, EPA Region IX has agreed to accept and use, for risk assessment purposes, the data generated from the ESC M^3 approach, providing the data quality is known and confirmation analyses are performed. The extraordinary benefit will be to eliminate any further action on those AOCs found to be clean using this approach. Finally this approach reduces the large number of non-detect samples that are customarily submitted for CLP-type (i.e., Contract Laboratory Program) analyses.

The ESC M^3 approach consists of the following three steps: Step 1) a "**massive**" sampling effort is first conducted at an AOC (e.g., 200 samples are collected rapidly with direct push methods, using a grid approach); the samples are analyzed on a daily basis using real time onsite methods and field screening (FS)-type data are generated; Step 2) a "**moderate**" sampling effort is then conducted (e.g., 20 splits of the Step 1 samples from "clean" locations in a clean AOC or a lesser amount of splits from "hot" locations in a contaminated AOC, along with boundary location [extent] samples) to provide onsite verification of the FS-type data; the samples are analyzed using onsite CLP-type methods and field quantitation (FQ)-type data are generated with an agreed upon level of QC; and finally, Step 3) a "**minimum**" sampling effort is conducted (e.g., 4 splits of the Step 2 samples from "clean" locations for a clean AOC and from "hot" and boundary locations for a contaminated AOC) to provide verification of the FQ-type data; these confirmation samples are sent to an offsite laboratory for analysis, and CLP-type data are generated.

Note that both the FS and FQ steps will generate quantitative results (i.e., concentration values for every analyte). The main difference is in the level of precision. Studies have shown the FS data precision to be comparable to CLP-type precision. While the level of QC for the CLP-type data is known, the appropriate levels and amounts of QC for the FS-type and FQ-type data still need to be defined.

All FS-type and FQ-type data will be loaded into an onsite data management system with three-dimensional (3-D) visualization capabilities. These data will be viewed electronically by site managers onsite and by Decision-Makers (including regulatory agencies) offsite at the end of each day. Thus, remedial decisions will be made on a daily basis, rather than, as is typical of current practices, months or years after each phase of the site characterization field work has been completed. It is possible that only one field investigative effort will be required using this approach since data gaps can be seen on a daily basis and then accounted for on succeeding days while the investigation is ongoing. Remobilization time and costs can be eliminated greatly accelerating the remedial process while drastically reducing the costs.

Cost estimates at a Federal Facility in California have shown this approach can realize a substantial cost savings when compared to the traditional RI/FS site characterization approach. Recent technological advances in computer hardware (storage, memory, processor and bus speed, costs) and software (databases, operating systems) have enabled corresponding advances in field analytical instruments and

methods. The time has come to use the ESC M^3 approach in conjunction with the Effective Data concept to dramatically reduce costs and increase defensibility of environmental decisions.